

**SIGNPOSTS of PLANETS**  
**NASA Goddard Space Flight Center**  
**April 12, 13, 14**  
**2011**

**Meeting Schedule**  
**DRAFT: March 22, 3:00 pm**

**When you see a disk, what can it tell you about the  
underlying planetary system?**

**Tuesday, April 12**

Buses:

8:30 AM – First bus leaves Holiday Inn for Goddard's Main Gate

8:00 AM – First bus leaves the Hilton for Goddard's Main Gate

10:00 am-10:10am

*Welcome*

**Marc Kuchner** (Goddard Space Flight Center)

**Session I: Overview**

**Chair: Sarah Maddison**

10:10 am-10:45 (review)

*Theory of Disk-Planet Interactions, An Overview*

**Mark Wyatt** (Cambridge University)

10:45 am-11:00 Coffee!

11:00 am-11:35 (review)

*Observations of Disk Evolution, an Overview*

**Thayne Currie** (NASA Goddard Space Flight Center)

11:35 am-12:10pm (review)

*Hydro Simulations of Planet Signposts*

**Sijme-Jan Paardekooper** (Cambridge University)

12:10pm-2:30 pm

Lunch and Posters

**Session II: Transitional Disks**

**Chair: Avi Mandell**

2:30-3:05 (review)

*Modeling Disks with Inner Holes and Gaps: Evidence for Newly-Formed Planets*

**Catherine Espaillat** (CfA)

3:05-3:40: (review)

*Non-planet Mechanisms for Sculpting and Clearing Gas Disks*

**Richard Alexander** (University of Leicester)

3:40-4:00 Coffee!

4:00-4:20

*The Life and Times of Transitional Disks*

**James Muzerolle** (Space Telescope Science Institute)

### Session III: Resolved Imaging of Young Disks

**Chair: Carol Grady**

4:20-4:55 (review)

*Signs of Planets in Young Disks*

**Hannah Jang-Condell** (Space Telescope Science Institute)

4:55-5:15

*Implications of Giant Planet Formation in the Protoplanetary Disk around AB Aurigae*

**Jun Hashimoto** (National Astronomical Observatory of Japan) and Takayuki Muto

(Tokyo Institute of Technology)

5:15-5:35

*Observable structures in illuminated, optically thick gas and dust disks*

**Pawel Artymowicz** (University of Toronto) and Jeffrey Fung (University of Toronto)

Buses:

6:00 PM - Leaves Goddard Visitors Center for the Holiday Inn

6:00 PM - Leaves Goddard Visitors Center for the Hilton

## Wednesday, April 13

Buses:

8:30 AM – First bus leaves Holiday Inn for Goddard's Visitors Center

8:00 AM – First bus leaves the Hilton for Goddard's Visitors Center

9:00-9:20

*Planet Gaps in the Dust Layer of 3D Protoplanetary Disks: Observability with ALMA*

**Jean-François Gonzalez** (Centre de Recherche Astrophysique de Lyon, France), Sarah T. Maddison (Swinburne University of Technology, Melbourne, Australia), Christophe Pinte (IPAG, Grenoble, France), Laure Fouchet and François Ménard (Universität Bern, Switzerland and IPAG, France)

9:20-9:40

*A Young Exoplanet Caught at Formation*

**Adam Kraus** (University of Hawaii Institute for Astronomy)

9:40-10:00

*HD 100546: a disk, a gap, and a planet?*

**Francois Menard** (IPAG, Observatoire de Grenoble), Wing-Fai Thi (IPAG, Observatoire de Grenoble), Myriam Benisty (MPIA, Heidelberg), C. Pinte, P. Varniere, and the GASPS Consortium

10:00-10:20 Coffee!

#### **Session IV: Submillimeter to IR**

**Chair: David Leisawitz**

10:20-10:55 (review)

*Signposts of Planets Observed by Herschel*

**Jane Greaves** (University of St Andrews)

10:55-11:30 (review)

*Planet-Induced Debris Disk Dynamics*

**Alice Quillen** (University of Rochester)

11:30-12:00

*Signposts of Planets JWST Will Observe*

**Mark Clampin** (NASA Goddard Space Flight Center)

12:00-2:45 Lunch, JWST Highbay Tour, and Posters

2:45-3:20 (review)

*Sub-mm Imaging of Disks*

**David Wilner** (CfA)

3:20-3:40

*Spatially resolved submm imaging of the HR 8799 debris disk*

**Jennifer Patience**, Bulger, King, Ayliffe, Song, Pinte, Koda, Dowell, Kovacs & Carpenter

3:40-3:55 Coffee!

3:55-4:15

"DUNES": A Herschel search for cold, faint discs around nearby stars  
**C. Eiroa** (Universidad Autonoma de Madrid), G. Pilbratt (European Space Agency) and the DUNES team.

### **Session V: Other Signs In Disks**

**Chair: Meredith Hughes**

4:15-4:50 (review)

*Non-Planet Debris Disk Structures*

**Kate Su** (University of Arizona)

4:50-5:10

*Spitzer Evidence for an LHB-Like Delivery of Organics & Water at 1.4 Gyr to the THZ of Eta Corvi*

**Carey M. Lisse** (Johns Hopkins University Applied Physics Lab), C.H. Chen (STScI), M.C. Wyatt (University of Cambridge), A. Morlok, D.M. Watson, P. Manoj, and T. Currie

5:10-5:30

*Debris dust and giant collisions*

**Alycia Weinberger** (Carnegie DTM)

5:30 Walk to the visitor's center, and move cars to the visitor's center parking lot.

6:00 Bus leaves from the Visitor's Center to the banquet.

7:00 – 9:00 PM - BANQUET

Mike's Restaurant/Crab House, 3030 Riva Road, Riva, MD 21140

9:00 Buses leave the banquet. One bus goes to the Holiday Inn; one goes to the Visitor's Center.

## **Thursday, April 15**

Buses:

8:30 AM – First bus leaves Holiday Inn for Goddard's Visitors Center

8:00 AM – First bus leaves the Hilton for Goddard's Visitors Center

### **Session VI: Direct Imaging of Disks and Planets**

**Chair: Justin Crepp**

9:00-9:35 (review)

*Planets Found by Direct Imaging*

**Christian Marois** (Herzberg Institute of Astrophysics)

9:35-9:55

*Beta Pictoris b and its link to the debris disk*

**Anne-Marie Lagrange** (IPAG/CNRS), M. Bonnefoy (Max Planck Heidelberg), Anthony Boccaletti, (LESIA/CNRS) and Gael Chauvin (IPAG/CNRS)

9:55-10:40

*HST Imaging of Disks*

**Glenn Schneider** (University of Arizona) and **Karl Stapelfeldt** (JPL)

10:40-10:55 Finally, some coffee!

10:55-11:30 (review)

*Signposts of Planets Observed By SEEDS*

**Mike McElwain** (NASA Goddard Space Flight Center)

11:30-12:05 (review)

*Signposts of Planets Observed By NICI*

**Michael Liu** (University of Hawaii)

12:05-1:30

Lunch and Posters

## Session VII: Dynamical Evolution of Planetary Systems

Chair: Brian Jackson

1:30-1:50

*A Signpost of Disks in the Distribution of Planets*

**Ruth Murray-Clay** (Harvard-Smithsonian CfA)

1:50-2:25 (review)

*Debris disks as signposts of terrestrial planet formation*

**Sean Raymond** (Laboratoire d'Astrophysique de Bordeaux)

2:25-2:45

*Locating Planetesimal Belts in Multiplanet Systems*

**Amaya Moro-Martin** (Centro de Astrobiología, INTA-CSIC)

2:45-3:20 (review)

*Born Again Disks as Signposts of Planets*

**John Debes** (NASA Goddard Space Flight Center)

3:20-3:35 Another sweet hit of coffee

## Session VIII: The Future

Chair: Olivier Absil

3:35-4:10 (review)

*Exozodiacal Dust and Direct Imaging of ExoEarths*

**Christopher Stark** (Carnegie Institute of Washington DTM)

4:10-4:30

*Modeling the huge debris ring around HD 207129*

**T. Loehne** (Astrophysical Institute Jena, Germany), J.-C. Augereau (IGEP Grenoble, France), S. Ertel, (Kiel University, Germany), A. V. Krivov (Astrophysical Institute Jena, Germany)

4:30-5:10 (review)

*Future Missions to Study Signposts of Planets*

**Remi Soummer** (Space Telescope Science Institute)

5:10-5:30

*Conference Summary*

**Wesley Traub** (JPL)

Buses:

6:00 PM - Leaves Goddard Visitors Center for the Holiday Inn

6:00 PM - Leaves Goddard Visitors Center for the Hilton

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## POSTERS

### Younger Disks

*Thermal Structure of a Protoplanetary Disk around HD163296*

**Eiji Akiyama** (Ibaraki University), Munetake Momose (Ibaraki University), Yoshimi Kitamura (Japan Aerospace Exploration Agency) and Hiroyuki Hayashi (Ibaraki University)

*Evolving Disks in the Cep OB3b Young Cluster*

**Thomas S. Allen** (University of Toledo), S. T. Megeath (University of Toledo), Judy Pipher (University of Rochester), Robert Gutermuth (Smith College) and Scott Wolk (CfA)

*High Resolution Spectroscopy of Warm Gas in Disks*

**Sean Brittain** (Clemson University)

*Imaging Polarimetry of Protoplanetary Disks: First Results from ExPo*

**Hector Canovas**, M. Rodenhuis, S. Jeffers, M. Min, and C. Keller (Utrecht University)

*Numerical simulation of disk-planet interactions in protoplanetary disks*  
**Ruobing Dong**, Roman Rafikov, and Jim Stone (Princeton University)

*Water in Protoplanetary Systems*  
**David Fedele** (JHU)

*Young Stellar Object Infrared Variability as a Possible Sign of Planet-Disk Interaction*  
**Kevin Flaherty** (University of Arizona), James Muzerolle (STSCI) and George Rieke (University of Arizona)

*Water Ice in the GM Aur Circumstellar Disk*  
**Katherine B. Follette** (University of Arizona), **Glenn Schneider** (University of Arizona)  
**Carol Grady** (Eureka Scientific), Philip Hinz, Laird Close, and TJ Rodigas (University of Arizona)

*The Last Remnants of Primordial Disk Material*  
**Elise Furlan** (JPL, Caltech)

*Signposts of Planet Formation in the Disk of GM Aur*  
**Jeremy Hornbeck** (University of Louisville), Carol Grady (GSFC and Eureka Scientific), Gerard Williger (University of Louisville and U. de Nice, France), A. Brown (U. Colorado), M. Perrin (STSci), J. Wisniewski (U. Washington) et al.

*Transitional disks in the youngest nearby star-forming regions: insights of planet formations*

**Kyoung Hee Kim** (University of Rochester), Dan Watson (University of Rochester), Manoj Puravankara (University of Rochester), Bill Forrest (U of Rochester), Joan Najita (NOAO) and Nuria Calvet (U of Michigan)

*A Search for Substellar Companions of T Tauri Stars*  
**C. M. Johns-Krull**, N. Mahmud, P. Hartigan (Rice University), L. Prato, C. Crockett (Lowell Observatory), D. Jaffe (UT Austin) and C. Beichman (IPAC)

*The Masses of Protoplanetary Disks ("Proplyds") in the Orion Nebula Cluster*  
**Rita K. Mann** (NRC Herzberg Institute of Astrophysics) and Jonathan P. Williams (Institute for Astronomy)

*Truncation of Circumplanetary Discs by Tidal Torques*  
**Rebecca G. Martin** and Stephen H. Lubow (STScI)

*The Role of Lift in Class I to Class II Sources*  
**Michele M. Montgomery** and Eduardo Martin (UCF)

*Stripping a debris disk by gravitational interaction with an inner planet*  
**Etienne Morey** and Jean-François Lestrade (Observatoire de Paris)

*The correlation between crystalline forsterite location and gap formation in the disk of HD100546*

**G.D. Mulders** (University of Amsterdam), L.B.F.M. Waters (SRON Netherlands Institute for Space Research), Dominik, C (University of Amsterdam) and the DIGIT team

*Mid-Infrared Variations in Young Stars in Orion*

**Luisa Rebull**, Maria Morales-Calderon, John Stauffer (Spitzer Science Center) and the rest of the YSOVAR team

*Radio and Infrared Studies of Nearby, Irradiated, Gaseous Protoplanetary Disks*

**G. Germano Sacco & Joel H. Kastner** (Rochester Institute of Technology), E. Flaccomio & B. Stelzer (INAF, Palermo, Italy), I. Pascucci (U. Arizona), M. Sterzik (ESO), K. Oberg, C. Qi, & D. Wilner (Harvard/SAO CfA), P. Hily-Blant & T. Forveille (IPAG, Grenoble, France), D. Rodriguez & B. Zuckerman (UCLA)

*The GQ Lupus Protoplanetary Disk System*

**Catarina Ubach** (Swinburne University, Australia), Sarah Maddison (Swinburne University, Australia), Francois Menard (Observatoire de Grenoble, France)

*Transitional and Pre-transitional Disks: Gap Opening by Multiple Planets?*

**Zhaohuan Zhu** (University of Michigan), Richard Nelson (Queen Mary University of London), Lee Hartmann (University of Michigan), Catherine Espaillat (CfA) and Nuria Calvet (University of Michigan)

## Older Disks

*Studying debris disks with near-infrared interferometry*

**O. Absil** (University of Liège), J.-C. Augereau (IPAG, Grenoble), J.-B. Le Bouquin (IPAG, Grenoble), V. Coudé du Foresto LESIA (Paris), D. Defrère, MPIfR (Bonn) E. Di Folco CEA (Saclay)

*Holey debris disks, Batman! Where are the planets?*

**Vanessa Bailey**, Phil Hinz, **Kate Su**, Nicholas Ballering, George Rieke, and Laird Close (University of Arizona, Steward Observatory)

*Using the DEBRIS Survey to Constrain Disc Radii*

**Mark Booth** (Herzberg Institute of Astrophysics) and the DEBRIS Team

*Mid-infrared imaging of exo-Earths: impact of exozodiacal disk structures*

**Denis Defrère** (Max Planck Institute for Radioastronomy), **Olivier Absil** (University of Liege), **Christopher Stark** (Carnegie Institute of Washington DTM), R. den Hartog (Netherlands Institute for Space Research) and **William Danchi** (NASA GSFC)

*Keck Adaptive Optics Imaging of the HD 32297 Debris Disk*

**Tom Esposito** (University of California, Los Angeles), Michael P. Fitzgerald (University of California, Los Angeles), Paul Kalas (University of California, Berkeley), and James R. Graham (Univ. of Toronto)

*Constraining Small Body Disruption Parameters--- Towards Reducing Confusion in Exoplanet Searches*

**Ashley Jeanne Espy** (University of Florida/ University of Central Florida), Josh Colwell (University of Central Florida), Stanley Dermott and Thomas Kehoe (University of Florida).

*The Frequency and Composition of Extrasolar Asteroids*

**Jay Farihi** (University of Leicester), Michael Jura and Ben Zuckerman (University of California, Los Angeles)

*Modal Analysis on the Disk Instability Induced by Radiation Pressure*

**Jeffrey Fung** (University of Toronto) and **Pawel Artymowicz** (University of Toronto)

*Enstatite-rich Warm Debris Dust Around HD165014*

**Hideaki Fujiwara** (Subaru Telescope, National Astronomical Observatory), Takashi Onaka (University of Tokyo), Daisuke Ishihara (Nagoya University), and the AKARI/VEGAD Team

*Spatially Resolving Debris Disk Structures at Millimeter Wavelengths*

**A. Meredith Hughes** (UC Berkeley), David Wilner and Sean Andrews (Harvard-Smithsonian Center for Astrophysics), Brian Mason (NRAO), and Jonathan Williams (IfA)

*Sources of the zodiacal dust cloud*

**Sergei I. Ipatov** (Catholic Univ of America, Space Research)

*Finding planets within exozodiacal disks: The relevance of prior geometry constraints*

**Markus Janson** (University of Toronto)

*Steady-state evolution of debris disks around solar-type stars*

**Noé Kains** (ESO/ University of St Andrews), **Mark Wyatt** (IoA, University of Cambridge), and **Jane Greaves** (University of St Andrews)

*A detailed study of two debris disks seen by Herschel*

**Jeremy Lebreton** (IPAG / Grenoble) and the GASPS and DUNES consortia

*Stripping a debris disk by close stellar encounters in an open cluster*

**Lestrade, J-F**, Lassus, A., Phou, N., and Morey, E. (Observatoire de Paris)

*Millimetre observations of the Beta Pictoris debris disk*

**Sarah Maddison** (Swinburne University, Australia)

Chris Wright (UNSW@ADFA, Australia)

*Resolved Debris Discs in the Herschel DUNES Survey*

**Jonathan Marshall** (Universidad Autonoma de Madrid) and the DUNES consortium

*Spitzer IRS Spectroscopy of Dust Debris Around Main Sequence Stars*

**Tushar Mittal** (Johns Hopkins University), **Christine Chen** (Space Telescope Science Institute), Casey Lisse (JHU-APL), M.Puravankara (Univ. of Rochester), D.Watson (Univ. of Rochester), L.Keller (Ithaca College), F.Morales (USC) and M.Werner (JPL)

*Common Warm Dust Temperatures around Main Sequence Stars*

**Farisa Y. Morales** (JPL), George Rieke (UofA), Michael Werner (JPL), Geoffrey Bryden (JPL), **Karl Stapelfeldt** (JPL), **Kate Su** (University of Arizona)

*Generating resonant disc images using a fast Hamiltonian model*

**Alexander Mustill** (Institute of Astronomy, University of Cambridge) and **Mark Wyatt** (Institute of Astronomy, University of Cambridge)

*A Representative Particle Method for Modeling Planet Signposts in Debris Disks*

**Erika Nesvold** (University of Maryland, Baltimore County) and **Marc Kuchner** (NASA GSFC)

*The WISE Debris Disk Survey*

**Deborah Padgett** (California Institute of Technology) **Karl Stapelfeldt** (JPL), Wilson Liu (California Institute of Technology), David Leisawitz (NASA GSFC) and the WISE Science Team

*DUNES: Pushing into the submillimetre*

**Göran L. Pilbratt** (European Space Agency, ESTEC/SRE-SA, Noordwijk), Jonathan P. Marshall (UAM, Madrid), Carlos Eiroa (UAM, Madrid) and the DUNES team

*Zodiac II: Debris Disk Imaging Potential*

**Wesley Traub** (JPL)

## Planets and Planet Formation

*A Subaru SEEDS Imaging Search for Extrasolar Planets Around High-Mass Stars*

**Joe Carson** (College of Charleston), Christian Thalmann (Anton Pannekoek Astronomical Institute), Miwa Goto (Max Planck Institute for Astronomy) and the SEEDS/HiCIAO/AO188 Team.

*Estimates of the Planet Yield from Ground-based High-Contrast Imaging Observations,*  
**Justin R. Crepp** and John Asher Johnson (California Institute of Technology)

*High Contrast Imaging of Planetary Companions Around a New Debris Disk Sample*

**Sasha Hinkley** (Caltech), **Karl Stapelfeldt** (JPL), Deborah Padgett (IPAC), Dimitri Mawet (JPL), Wilson Liu (IPAC)

*Angular momenta of rarefied preplanetary materials and formation of small-body binaries*  
**Sergei I. Ipatov** (Catholic Univ of America, Space Research)

*Reading the Signs: The Case for Spatial and Spectral Far-infrared Interferometry*  
**David Leisawitz** (NASA GSFC)

*Visible Nulling Coronagraph Progress Report*

**Richard Lyon** (NASA GSFC Code 667), **Mark Clampin** (NASA/GSFC Code 667), Peter Petrone (Sigma Space), Patrick Thompson (NASA GSFC) and Tim Madison (NASA GSFC)

*"Hot Jupiter" Spectroscopy from the Ground: A Progress Report*

**Avi M. Mandell** (NASA/GSFC), D. Deming (NASA/GSFC), G. Blake (Caltech), H. Knutson (UC Berkeley), M. Mumma (NASA/GSFC), G. Villanueva (GSFC/CUA), C. Salyk (UT Austin)

*"Tidal Downsizing" -- the new hypothesis for planet formation*

**Sergei Nayakshin** (University of Leicester)

*Archaeology with multi-planetary systems*

**Hanno Rein** (Institute for Advanced Study), John Papaloizou (University of Cambridge) and Willy Kley (University of Tuebingen)

*Collisional Growth of Planetesimals*

**Andrew Shannon** (University of Toronto) and Yanqin Wu (University of Toronto)